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No 314617

Date 16/4/97

PATENTS ACT 1953

COMPLETE SPECIFICATION

(To be furnished in Duplicate)

(a) Sliding Bore and rotary Valve concept For Internal combustion Engine

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HEREBY declare the invention, for which I/~~we~~ pray that a patent may be granted to me/~~us~~ and the method by which it is to be performed, to be particularly described in and by the following statement:

(c) This invention relates to a new engine design that can be used in most mechanical applications

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Most current engines have pistons that are connected to a single crankshaft via a connecting rod This has the problem of creating side thrust on the side of the cylinder wall which generates large amounts of friction and heat on the power stroke Although this has been common practice in modern engines it is by no means satisfactory Engine designers have come up with a part solution to this problem by offsetting the wrist pin in the piston so as to offer a more vertical drive to the crankshaft on the power stroke This has the inherent problem of retarding ignition timing to compensate for later crank angle settings Furthermore because of the side thrust present there is a high rate of wear on cylinders and pistons and poor sealing compared to what there could be if there was no side thrust

A previous attempt was made at solving this problem by connecting a piston to two crankshafts by fitting two wrist pins into the piston and running two connecting rods to two separate counter-rotating crankshafts Although a good idea for removing side thrust it made the piston more bulky more massive

One example of twin crankshaft patent is US Pat no 5,058,537

Rotary valves have been proposed for use with internal combustion engines to allow intake and exhaust gases to enter and exit the engine These valves have valve members mechanically connected to the crank shaft though shafts, gears chains, or flexible timing belts

Some examples of rotary valve patents are

US Pat No 3,130,953
US Pat No 5,329,897
US pat No 5,081,966
US Pat No 4,867,117
US Pat No 5,00,136

Each of these valves has a rotary barrel with side ports which is located in a normal cylinder head which sits over a head plate on top of a standard moving piston This invention has no moving piston, head, head gasket, head plate, or side ports in the valve The outer surface of the valve engages with the invented sliding bore The rotary valve invented by the author seals the sliding bore and has the sealing rings mounted on the valve head which can use the improved sealing quality of modern ceramic material

The object of the present invention is to eliminate side thrust thereby improving mechanical and thermal efficiency and reducing the number of moving parts

One preferred form of the invention will now be described with reference to the accompanied drawings, of which

Fig 1 Shows the invented sliding bore connected to two counter rotating crankshafts by two connecting rods all at top dead centre (1) being the crank shafts, (2) being connecting rods, (3) being the sliding bore The crank shafts are counter rotating and can be geared together by any appropriate configuration of gearing or can have separate drives off either one, as long as the load is approximately equal The right crankshaft turns anti clockwise, and the left crankshaft turns clockwise with the engine in a vertical position

Fig 2 Shows (4) being the engine casing with (9) being the intake port, (6) being the exhaust port and (5) being a injection port / spark plug port The protrusions that the sliding bore reciprocates on can be part of the casing or separately machined pieces In the preferred embodiment the engine casing can be split horizontally though the centre of the crank shaft bearing housing

Fig 3 Shows (4) being the engine casing and protrusions, and (8) being the inlet port rods, which can be attached to the casing by nuts or some other means There can be a multiplicity of these rods, only two are shown in the cutaway view

Fig 4 Shows the engine casing and protrusions, the inlet port rods, and (7) being the invented rotary valve, which has had the valve bearings omitted in this drawing This valve can be geared by means of a

simple right angle drive and timing belt or chain to either of the crankshafts, at a ratio of one turn of the crank shaft to one turn of the valve if set up for a two stroke cycle

Fig 5 Shows (10) being the lower compression area with the sliding bore, connecting rods and crankshafts all at top dead centre, and the rotary valve with it's exhaust port lined up with the injection port / spark plug port

As a two stroke cycle the power stroke after T D C (top dead centre) will compress the gas in the lower compression chamber, and just before B D C (bottom dead centre), as the induction ports (20) clear the port rods (8), the compressed gas will be forced up though the ports into the top compression chamber At this time the rotary valve is lining up with the exhaust port which allows the compressed gas coming into the top compression chamber to expel the burnt charge up through the exhaust port As the crankshafts push the sliding bore back up, the port rods and rotary valve will seal thus creating a very high pressure area just before the engine reaches T D C The rotary valve will now be lining up with the injection port /spark plug port If using diesel as fuel a normal fuel injector will inject a measured amount of fuel into the super heated gas thus creating an explosion which will drive the sliding bore back down, compressing the next charge

Fig 6 Shows (12) being the upper compression area with the sliding bore, connecting rods, and crankshafts all at bottom dead centre The rotary valve is now lined up with the exhaust port (6), therefore allowing the new compressed gas from the lower compression chamber to be forced up through the induction ports to recharge the upper compression area, and forcing the burnt gas to be expelled through the exhaust port

Fig 7 Shows (7) being a side view of the rotary valve (15) is shown as being a combustion face view, with (19) being one example of the combustion chamber and (17) being the exhaust port (16) is shown as being a complete side view of the rotary valve with the rings (21) and keyway (22) (14) is shown as being a top view of the rotary valve (18) is shown as being the port rod with rings attached, and (11) is shown as a one way intake port valve which in the preferred embodiment could be a standard reed valve

Fig 8 Shows the complete drawing with all the related numbers, to parts or areas as follows

(1) Crankshafts
(2) Connecting rod
(3) Invented sliding bore
(4) Engine casing
(5) Injection port -glow plug port or spark plug port
(6) Exhaust Ports
(7) Invented rotary valve
(8) Port rods with rings
(9) Intake port
(10) Lower compression Chamber
(11) One way induction valve
(12) Upper combustion Chamber
(13) Right angle gear
(14) Top view of rotary valve
(15) Bottom view of the rotary Valve
(16) Side view of the rotary valve
(17) Exhaust port in rotary valve
(18) Port rod rings
(19) Combustion chamber
(20) Induction ports
(21) Rotary valve rings
(22) Rotary valve keyway

This invention relates to a new engine that has two counter rotating crank shafts mounted horizontal if the engine is viewed in a vertical position Connected to these crankshafts are two connecting rods which in turn are connected to a sliding bore which reciprocates on two protrusions, the lower one having ring groves machined into the top section refer Fig (4), the upper one having a rotary valve which the middle stem of the valve is fitted into a machined hole that runs on a vertical line through the dead centre of the protrusion Therefor if turning it will revolve in a perfect circular motion in relation to the dead centre of the protrusion, this valve has ring groves machined on the outside horizontal face which accept standard engine rings, refer Fig (4) number (21)

The valve will be mechanically connected to the crank shaft or crankshafts by gears and a rubber timing belt, or by another appropriate means The said valve turns at a ratio of one turn of the valve to one turn of the crankshaft if working on a two stroke cycle, or if a four stroke cycle two revolutions of the

crankshafts to one revolution of the valve this valve can also be powered by other appropriate means and sits in the top protrusion in bearings that are not shown in the accompanied drawings

As the sliding bore moves down on the start stroke it compresses a charge of gas in the lower compression area refer Fig (5) number (10), as the distance between the lower face of the sliding bore comes closer to the top of the protrusion it keeps building up pressure until the port rods clear the induction ports Refer Fig (6), at this time there is a rapid exchange of gas from the lower chamber to the upper chamber This gas under pressure forces out any gas in the top chamber as the rotary valve is now lining up with the exhaust port Refer Fig (6) number (6)

The sliding bore is then pushed back up by the crankshafts, as this happens the rotary valve has sealed off the exhaust port and the port rods have sealed off the induction port, there is now a rapid increase of pressure as the top compression face of the sliding bore comes closer to the lower combustion face of the rotary valve

While this is happening the rotary valve has moved towards the injection port, and just before the bore reaches T D C it exposes the lower portion of a standard fuel injector, which injects fuel into the super heated air and creates an explosion starting the whole cycle of again The injector and fuel circuit are not show in any drawings

What I claim is:

1 An engine which utilises a sliding bore attached to more than one crankshaft, reciprocating between two fixed protrusions to convert the kinetic energy of a gas into mechanical energy

2 An engine as claimed in claim 1 where the sliding bore is moving between a multiple number of fixed protrusions

3 A engine substantially as described and as illustrated in the accompanying drawings

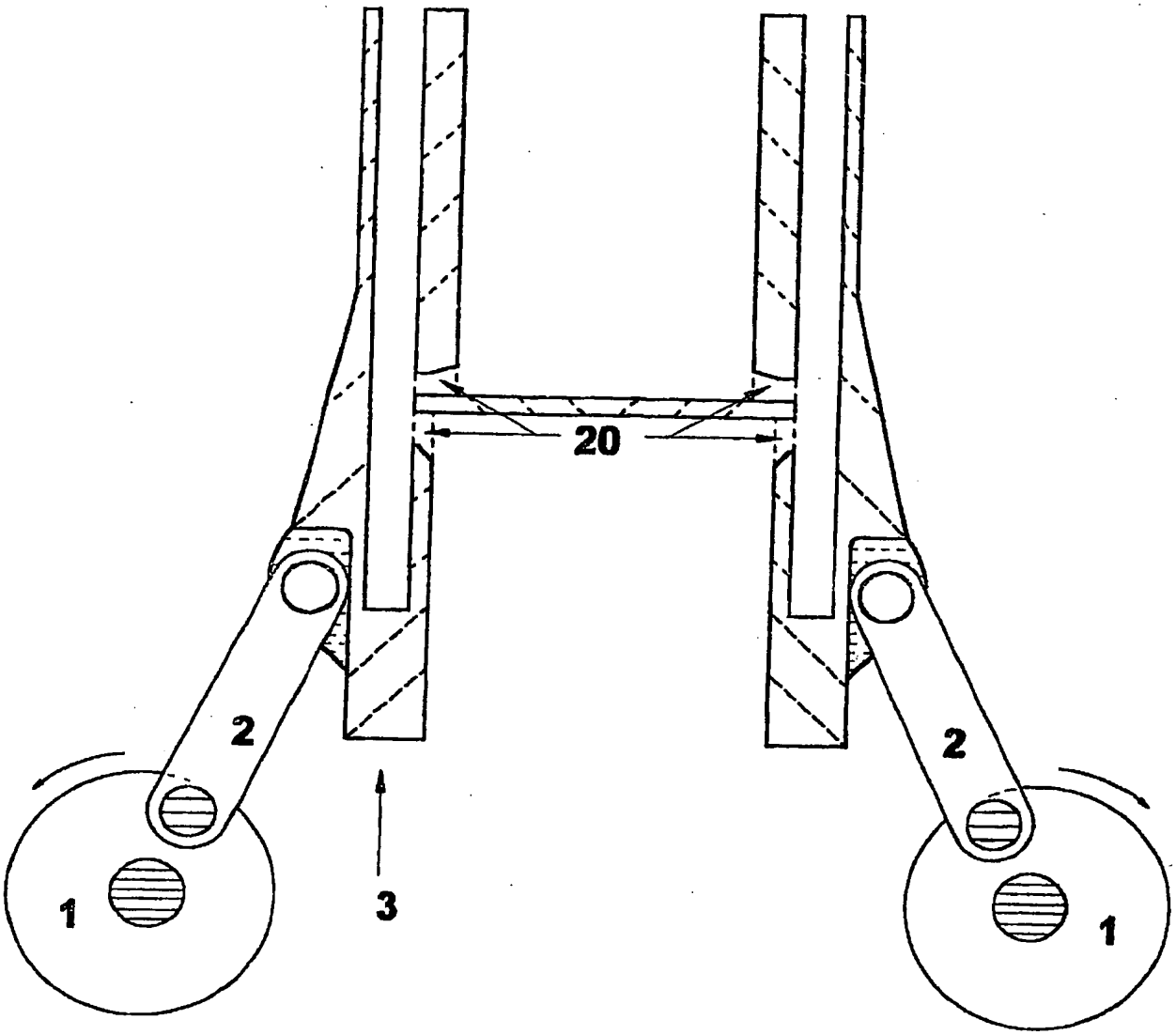

Fig 1 Page 4

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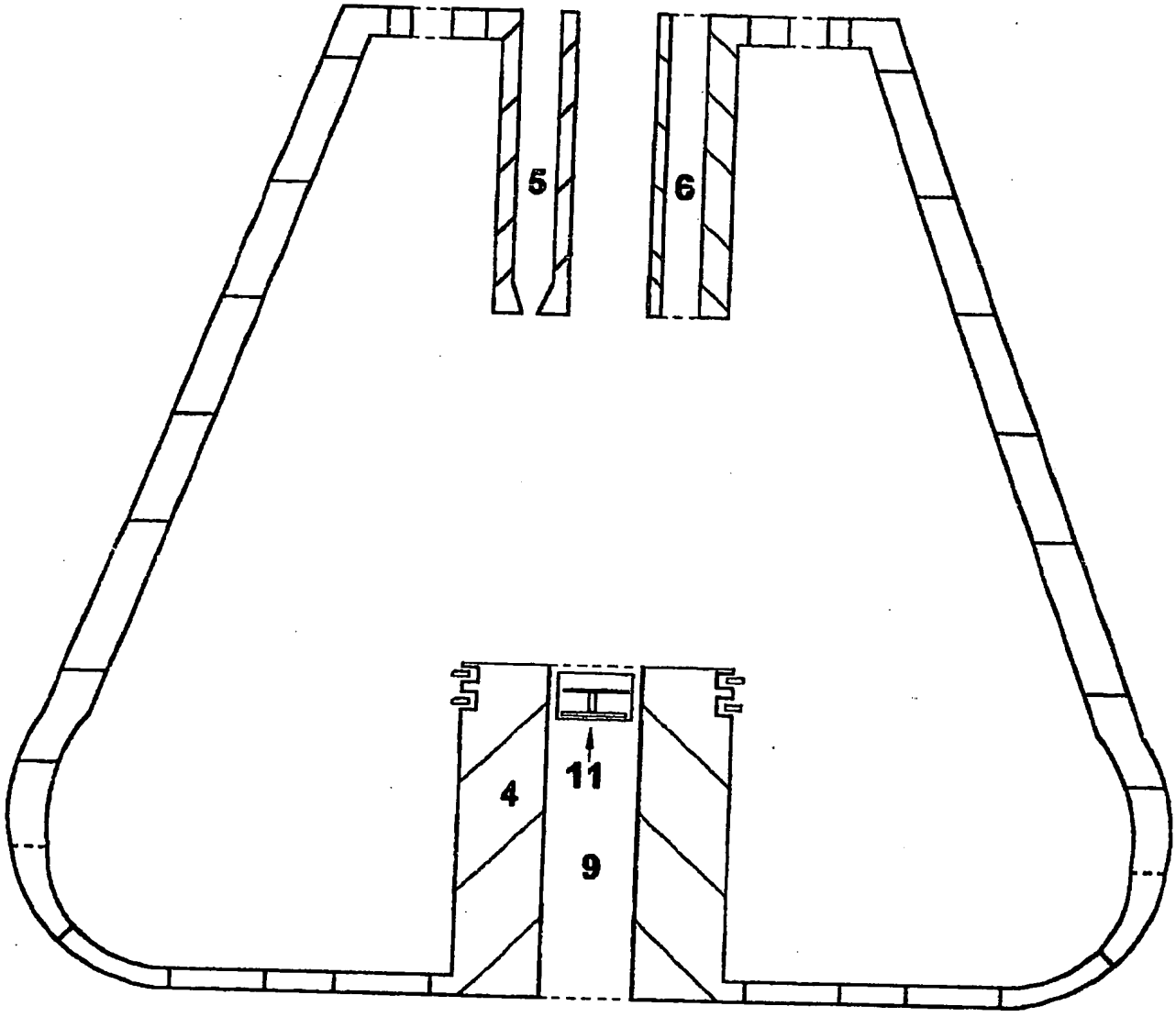

Fig 2	Page 5
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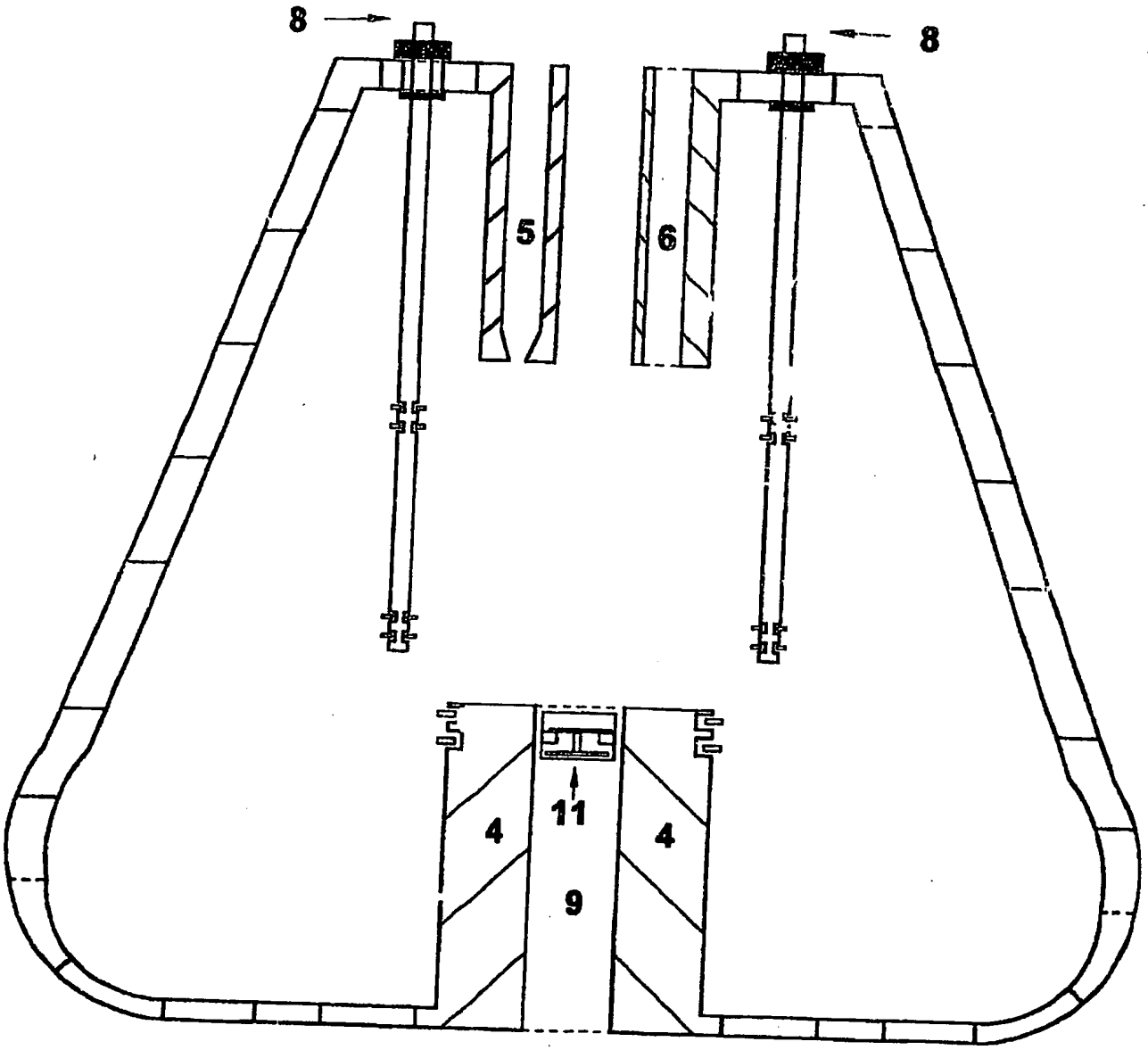

Fig 3 Page 6

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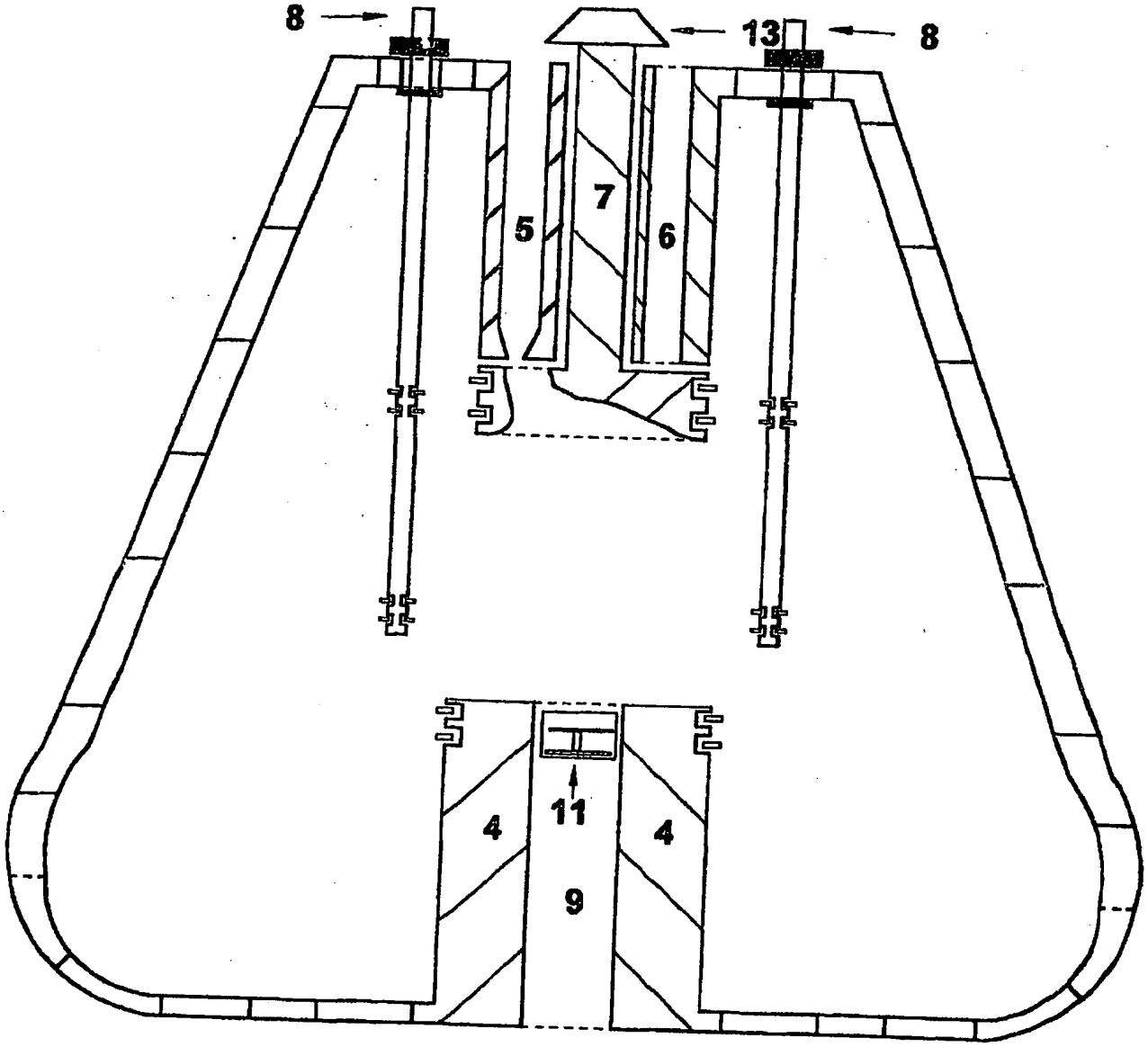

Fig 4	Page 7
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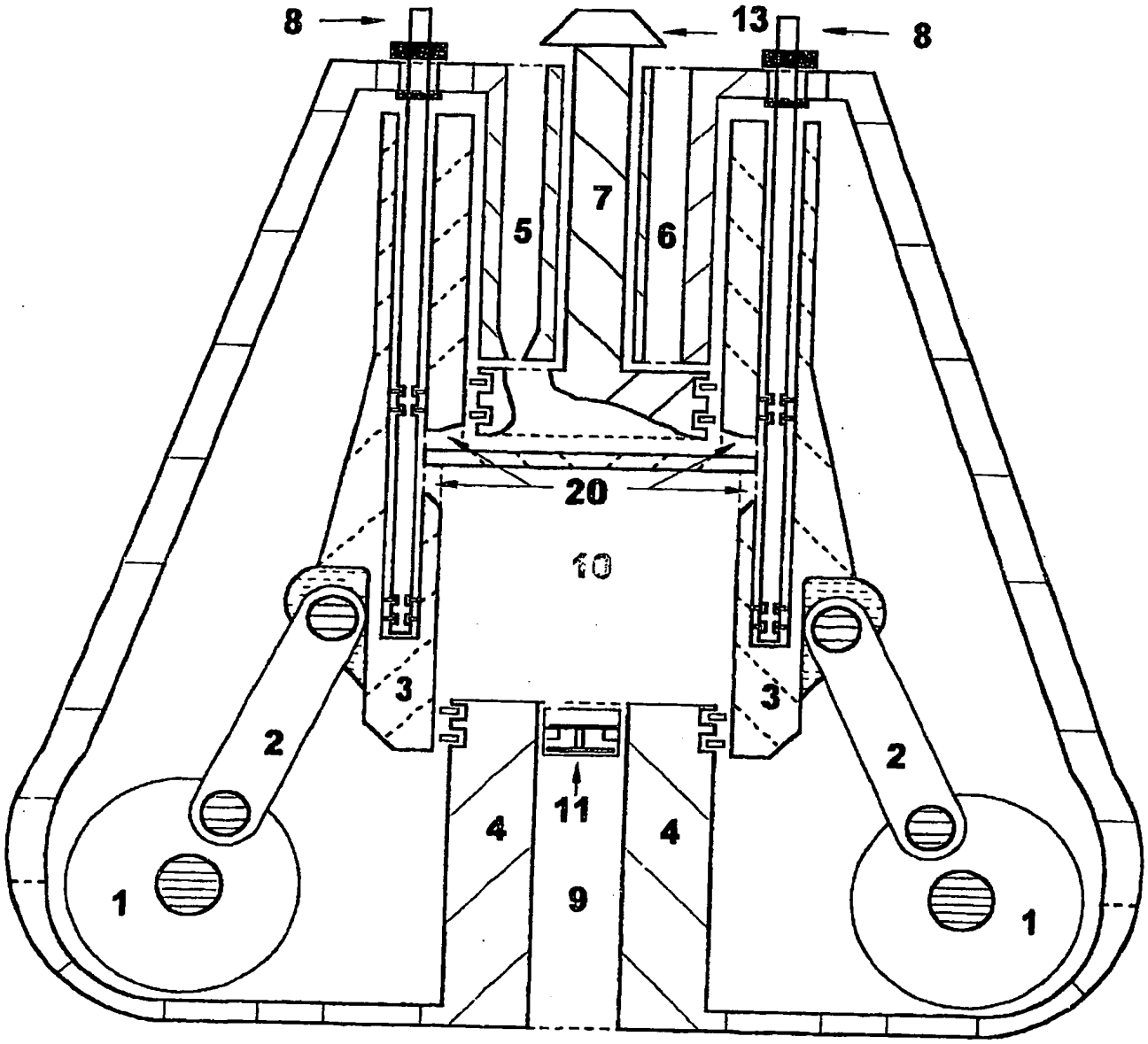

Fig 5	Page 8
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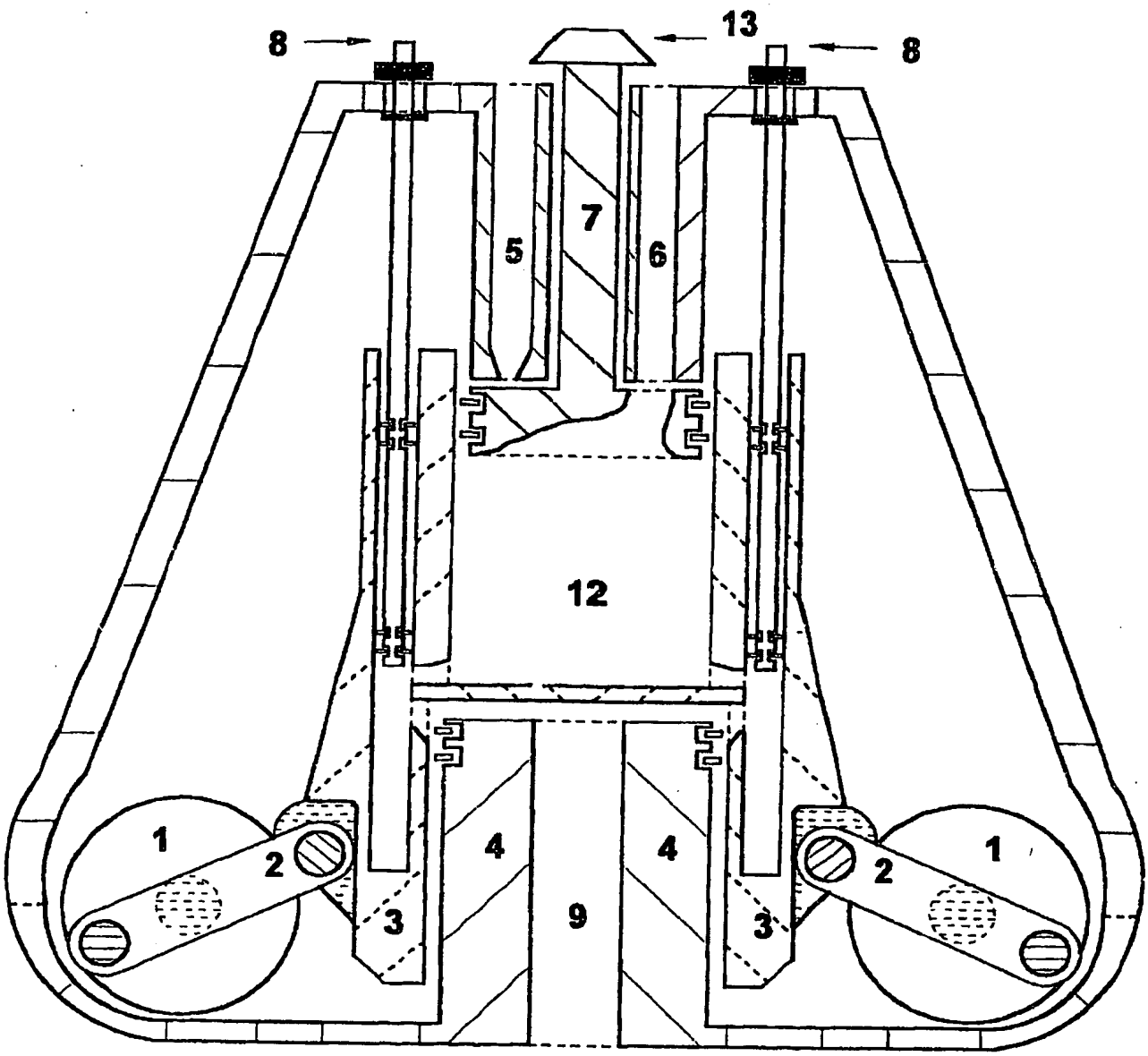

Fig 6 Page 9

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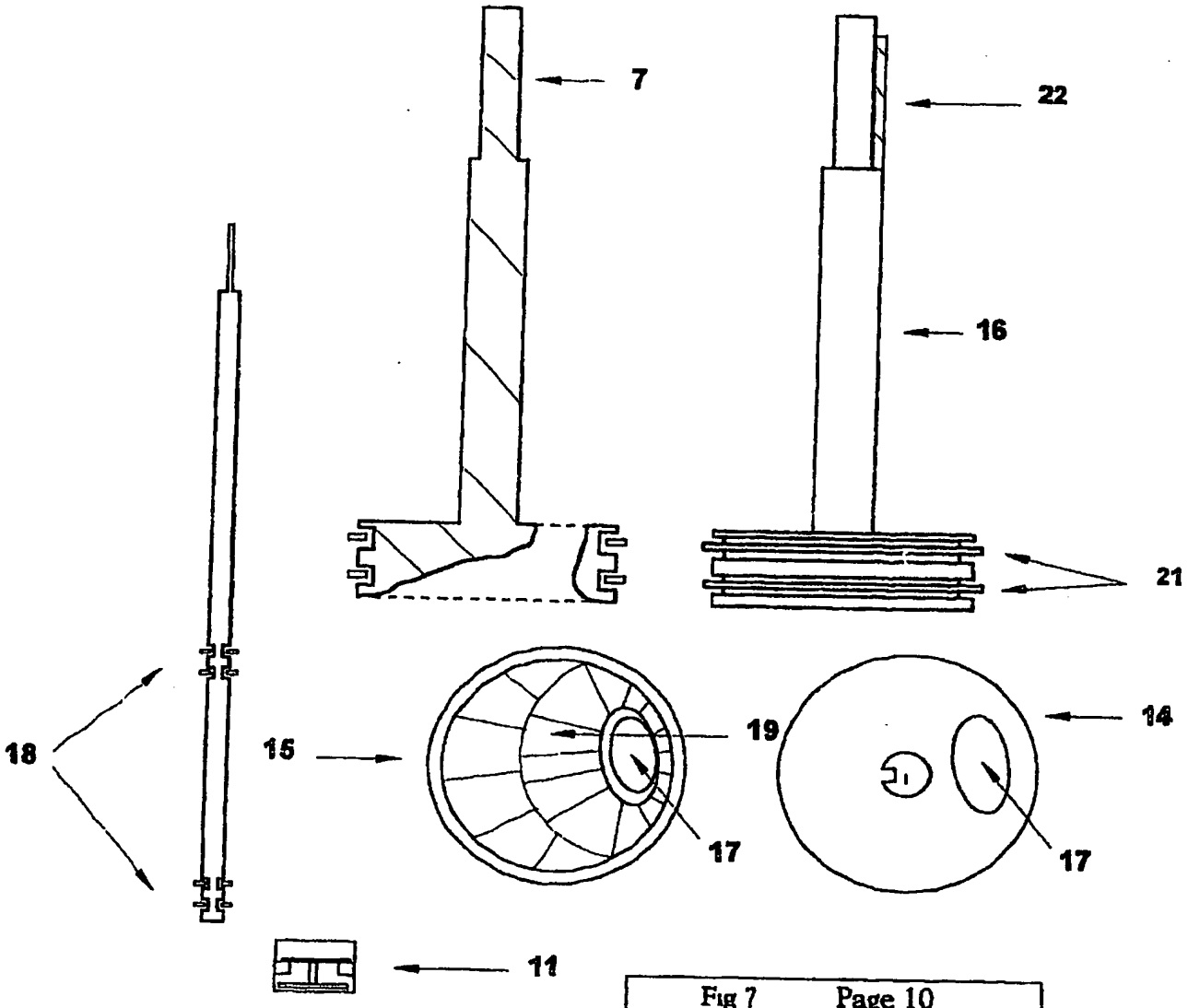

Fig 7 Page 10

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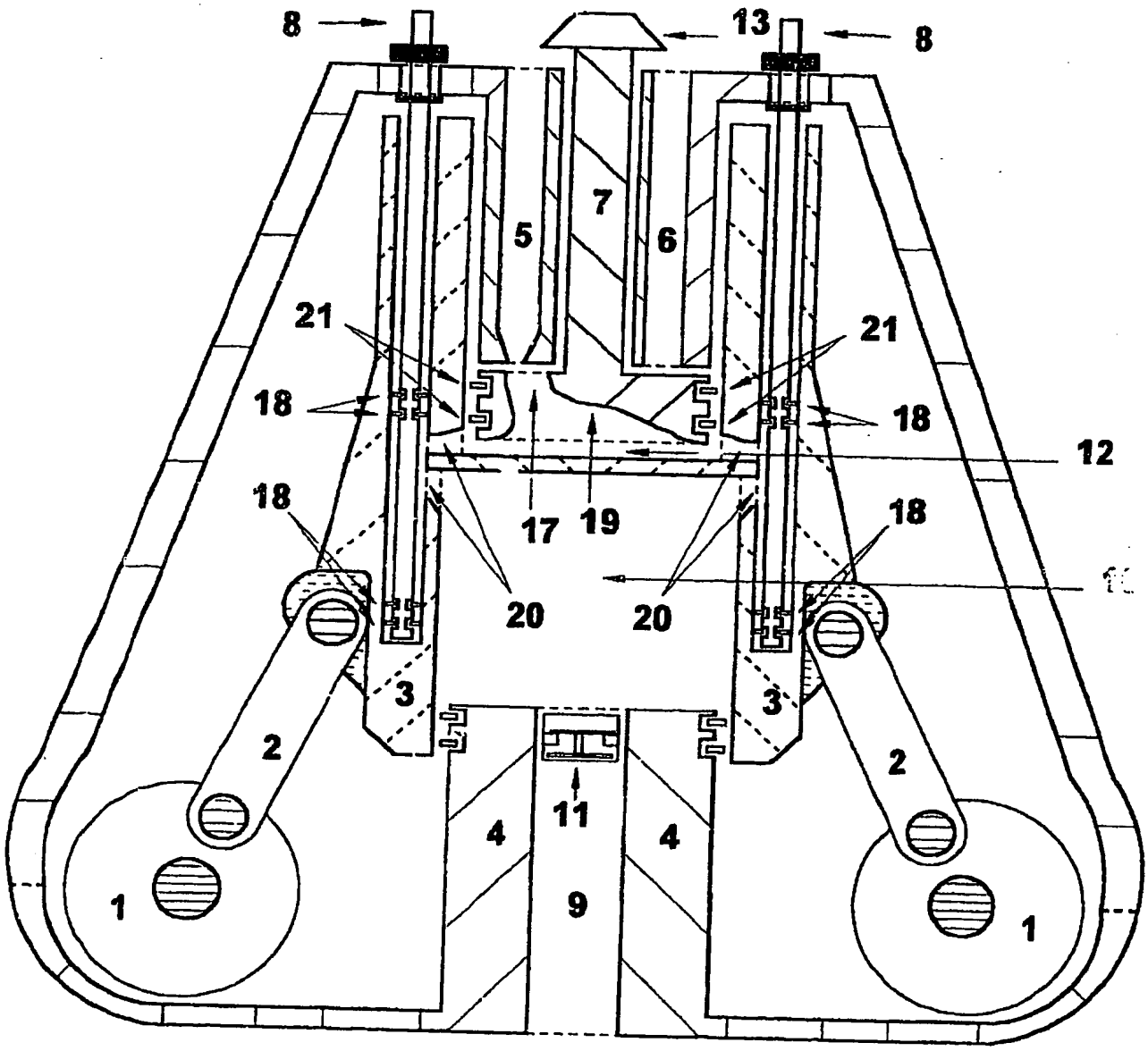

Fig 8 Page 11

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